We Claim:

1. An on-line purchase and load (OPAL) server for performing a transaction over a network using a virtual smart card, said OPAL server comprising:

a virtual smart card database having a plurality of records, each record including a virtual card identifier and a balance corresponding to a single virtual smart card;

a hardware security module;

a smart card emulator that receives smart card commands and processes said commands in conjunction with said virtual smart card database and said hardware security module; and

a pseudo card reader module that receives said smart card commands and relays said commands to said smart card emulator, whereby said OPAL server performs a transaction over said network using one of said records in said virtual smart card database.

2. An OPAL server as recited in claim 1 wherein said virtual card database further includes purchase algorithm identifiers, and wherein said hardware security module includes a plurality of purchase algorithms that are identified for use by one of said purchase algorithm identifiers, whereby said hardware security module may be used to perform cryptographic functions associated with a purchase.

3. An OPAL server as recited in claim 1 further comprising:

a user verification module that verifies a user accessing said OPAL server and generates a user identifier, said user identifier being suitable to identify one of said virtual smart card records in said card database.

4. An OPAL server as recited in claim 1 wherein said smart card emulator and said pseudo card reader module are implemented as a single software module.

5. An OPAL server as recited in claim 1 wherein said network is an internet over which said OPAL server communicates with a merchant server and a payment server to transact a purchase.

6. An OPAL server as recited in claim 1 wherein said network is an internet over which said OPAL server communicates with a bank server and a load server to load value onto said virtual smart card.

7. An OPAL server as recited in claim 1 wherein said network is an internet over which said OPAL server communicates with a web server and an authentication server to authenticate a user.

8. An OPAL server as recited in claim 1 wherein said OPAL server communicates over said network with a payment gateway for funding account authorization and clearing.

9. A network payment system for transacting a sale of merchandise over a network using a virtual smart card, said network payment system comprising:

a router for routing communication between entities attached to said network;

a merchant server in communication with said network, said merchant server having at least a first item of merchandise for sale;

a client terminal in communication with said network, said client terminal including an output device for reviewing said first item for sale and an input device for initiating a purchase transaction to purchase said first item for sale;

an on-line purchase server having a record in a database representing a virtual smart card; and

a payment server in communication with said network, said payment server including an interface for communicating with a security card and being arranged to receive a purchase message from said on-line purchase server and to transmit a confirmation message to said merchant server over said network, whereby said merchant server is authorized to release said item of merchandise to a user associated with said virtual smart card.

10. A network payment system as recited in claim 9 wherein said network is an internet and said merchant server includes a merchant web site for advertising said first item for sale over said internet.

11. A network payment system as recited in claim 9 wherein said on-line purchase server further includes

a hardware security module;

a smart card emulator that receives smart card commands and processes said commands in conjunction with said virtual smart card record of said database and said hardware security module, whereby said on-line purchase server implements a secure purchase over said network.

12. A computer-implemented method of transacting a sale of an item over a network using an on-line purchase server having a record in a database representing a virtual smart card, said method comprising:

receiving a cost of said item to be purchased by a user, said cost originating from a merchant server over said network;

formulating a draw request message using information in said virtual smart card record;

sending said draw request message to a payment server connected to said network so that said draw request may be processed by a security card associated with said payment server;

receiving a debit command from said payment server;

debiting a balance amount in said virtual smart card record by said cost; and

sending a debit response message to said payment server, whereby said merchant server may be informed that said sale of said item is a success and said merchant server may release said item to a user associated with said virtual smart card record.

13. A method as recited in claim 12 wherein said network is an internet and said merchant server includes a merchant web site for advertising said item over said internet.

14. A method as recited in claim 12 wherein said on-line purchase server includes a smart card emulator and said method further comprises:

sending smart card commands to said smart card emulator that processes said commands in conjunction with said virtual smart card record of said database to assist in formulating said draw request message.

15. A method as recited in claim 14 wherein said on-line purchase server includes a hardware security module and said method further comprises:

generating cryptographic signatures for use in transacting said sale using said hardware security module, whereby said on-line purchase server implements a secure transaction over said network.

16. A network loading system for loading value over a network onto a virtual smart card, said network loading system comprising:

a router for routing communication between entities attached to said network;

a bank server in communication with said network, said bank server arranged to debit a user account by an indicated value;

a client terminal in communication with said network, said client terminal including an input device for indicating a value to debited from said user account;

an on-line load server having a record in a database representing a virtual smart card; and

an issuer load server in communication with said network, said issuer load server including an interface for communicating with a hardware security module and being arranged to receive a load request including a virtual smart card signature and being further arranged to transmit a confirmation message to said bank server over said network, thereby confirming that said virtual smart card has been loaded by said indicated value.

17. A network loading system as recited in claim 16 wherein said network is an internet and said bank server includes a bank web site for accepting a load request.

18. A network loading system as recited in claim 16 wherein said on-line load server further includes

a hardware security module;

a smart card emulator that receives smart card commands and processes said commands in conjunction with said virtual smart card record of said database and said hardware security module, whereby said on-line load server implements a secure load over said network.

19. A network loading system as recited in claim 16 wherein said on-line load server and said issuer load server are the same computer.

20. A computer-implemented method of loading a virtual smart card over a network, said virtual smart card being represented as a record in a database of an on-line load server, said method comprising:

receiving from a bank server a request to load value onto said virtual smart card;

formulating a load request message using information in said virtual smart card record;

sending said load request message to an issuer load server connected to said network;

receiving a load command from said issuer load server;

loading said virtual smart card by said load value; and

sending confirmation information to said bank server, whereby said bank server is assured that said loading is a success.

21. A method as recited in claim 20 wherein said network is an internet and said bank server includes a bank web site for accepting a load request.

22. A method as recited in claim 20 wherein said on-line load server includes a smart card emulator and said method further comprises:

sending smart card commands to said smart card emulator that processes said commands in conjunction with said virtual smart card record of said database to assist in formulating said load request message.

23. A method as recited in claim 22 wherein said on-line load server includes a hardware security module and said method further comprises:

generating cryptographic signatures for use in transacting said load using said hardware security module, whereby said on-line load server implements a secure load over said network.

24. A method as recited in claim 20 wherein said on-line load server and said issuer load server are the same computer.

25. A network authentication system for authenticating a user over a network using a virtual smart card, said network payment system comprising:

a router for routing communication between entities attached to said network;

a web server in communication with said network, said web server allowing a user to redeem loyalty points in exchange for benefits;

a client terminal in communication with said network, said client terminal including an output device for reviewing said benefits and an input device for initiating a redemption of said loyalty points;

an on-line loyalty server having a record in a database representing a virtual smart card; and

an authentication server in communication with said network, said authentication server including an interface for communicating with a security card and being arranged to receive a debit message from said on-line loyalty server and to transmit a confirmation message to said merchant server over said network, whereby said merchant server is authorized to release said benefits to a user associated with said virtual smart card.

26. A network authentication system as recited in claim 25 wherein said network is an internet and said web server includes a web site for displaying said benefits over said internet.

27. A network authentication system as recited in claim 25 wherein said on-line loyalty server further includes

a hardware security module;

a smart card emulator that receives smart card commands and processes said commands in conjunction with said virtual smart card record of said database and said hardware security module, whereby said on-line loyalty server implements a secure authentication over said network.

28. A network authentication system as recited in claim 25 wherein said on-line loyalty server and said authentication server are the same computer.

29. A network authentication system as recited in claim 25 wherein said virtual smart card record in said database stores said loyalty points belonging to said user, and wherein said on-line loyalty server is further arranged to debit said loyalty points.

30. A computer-implemented method of redeeming loyalty points over a network using an on-line loyalty server having a record in a database representing a virtual smart card, said method comprising:

receiving an amount of loyalty points to be redeemed by a user for benefits, said amount originating from a web server over said network;

formulating a draw request message using information in said virtual smart card record;

sending said draw request message to an authentication server connected to said network so that said draw request may be processed by a security card associated with said authentication server;

receiving a debit command from said authentication server;

debiting a balance of said loyalty points in said virtual smart card record by said amount; and

sending a debit response message to said authentication server, whereby said web server may be informed that said redemption of said loyalty points is a success and said web server may release said benefits to a user associated with said virtual smart card record.

31. A method as recited in claim 30 wherein said network is an internet and said web server includes a web site for displaying said benefits over said internet.

32. A method as recited in claim 30 wherein said on-line loyalty server includes a smart card emulator and said method further comprises:

sending smart card commands to said smart card emulator that processes said commands in conjunction with said virtual smart card record of said database to assist in formulating said draw request message.

33. A method as recited in claim 32 wherein said on-line loyalty server includes a hardware security module and said method further comprises:

generating cryptographic signatures for use in transacting said redemption using said hardware security module, whereby said on-line loyalty server implements a secure transaction over said network.